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ABSTRACT

This paper reports on an investigation of technology infusion at QiBao Middle School, one of the leading secondary schools in Shanghai (China). Major focuses of the study are models of professional development for teachers and how teachers enlist the help of their students. Results are presented related to: technology infrastructure; technology competence and training for faculty and staff; technology expectations and activities for students; the QiBao Research Association for Modern Educational Technology; the impact of technology in QiBao; and multimedia courseware contests. It is concluded that the Chinese experience may have relevance for American schools; while China started well behind American schools in access to and use of information technology, it has rapidly been able to mobilize and train teachers to infuse technology. (MES)

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Technology Infusion in A Chinese Middle School: A Comparative Perspective

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Abstract: The success of Chinese secondary schools in preparing students for academic excellence is often discussed by educators in the West. However, there has been little research or in-depth analysis of the Chinese comprehensive educational process and the continuous growth philosophy and strategy of its curriculum, teachers, and staff in the maintenance of students and the institution. In this study, the authors report their investigation of one of the leading secondary schools in China's most sophisticated city, Shanghai, in the daunting task of technology infusion. Major focuses of the study are: Models of professional development for teachers and how they enlist the help of their students. The authors believe that Chinese experience may have relevance for American schools. While China started well behind American schools in access to and use of information technology, it is impressive how rapidly it has been able to mobilize and train teachers to infuse technology.

Introduction

Learning about technology and learning to integrate it in meaningful ways into teaching and learning is a daunting task. What models of professional development really work to help

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teachers with this challenge? How can teachers help themselves? How can teachers enlist the help of their students? In the United States, despite the recognized need for teachers to use and teach new technologies, a large percentage of teachers remain under prepared to exploit technology in classrooms ((Perischitte, Tharp, & Caffarella; 1999; ISTE, 1999). Reengineering pedagogy represents a profound paradigm shift that is well advanced in the U.S. economy and culture. While China started well behind American schools in access to and use of information technology, it is impressive how rapidly it has been able to mobilize and train teachers to infuse technology into the secondary education curriculum.

The success of Chinese secondary schools (called "middle schools" in china that cover grades 7-12) in preparing students for academic excellence for university and life beyond is often discussed by the educators in the west. But there has been little research or in-depth analysis of the Chinese comprehensive educational process, or the continuous growth philosophy and strategy of its curriculum, teachers, and staff in the maintenance of students and the institution. In this paper, the authors report their investigation of one of the leading middle schools in one of China's most sophisticated cities, Shanghai. The authors, three of whom are currently professors in U.S. universities and two are senior educators in Qibao Middle School, Shanghai, China, are the product of such "middle schools" in Shanghai in the mid 60s and 70s. Through this study, the authors suggest relevant experiences and examples for schools in the United States.

Qibao Middle School

QiBao Middle School in Shanghai was founded in 1947. According to the 1996-2000 QiBao Middle School Five-Year Development Plan, the school's aims were to become a national model for secondary schools through the implementation of a comprehensive curriculum. The goals of the school included producing well-rounded graduates and continuous professional and personal growth of its employees. The school strives to make a positive impact on the entire nation while serving Shanghai and the south region of China, promoting academic excellence, cultural interaction, and domestic and international diversity. There is an emphasis on continuous improvement and self-perfection. The school's leadership realizes that one of the important means by which these goals can be reached is through the effective use of modern education technology.

Technology Infrastructure

Qibao Middle School has developed its technology infrastructure, which includes a computer network for instruction and administration and an audio/video network for instruction only. Qibao's well-developed technology infrastructure has enabled comprehensive and interactive instruction with data formats in text, pictures, images, sound, and animation, using technologies from network, computer, VCD player, and multimedia projectors, and enhanced the quality of instructional management in Qibao.

Technology Competence and Training for Faculty and Staff

Unlike the American system, where the emphasis of technology training often focuses on students, in Chinese secondary schools, technology training is also mandated for teachers, staff, and the administrative personnel. In order to provide meaningful and relevant technology training, the School developed standards and set timelines for various constituents, with the focus on three groups: middle level administrators, clerical staff, and young and middle aged faculty (age 45 or below).

Middle Level Administrators include senior academic and administrative personnel (e.g., dean of academic affairs, dean for administrative affairs, bursar, etc.). Training activities for middle level administrators are designed to improve their ability to use information technology to optimize their leadership and management roles. Clerical Staff include secretaries and data entry personnel. Traditionally, secretaries are required to be proficient in typing Chinese. With today's computer technology, they must learn keyboarding and computer typing skills to type Chinese characters using a conventional English alphabet keyboard.

Young and Middle-Aged Faculty are teachers under the age of 45. Seventy-eight percent (78%) of Qibao's teachers fall into this group. They form the backbone for instruction. The objectives for this group's training are accomplished in two units. The first unit covers:

- basic knowledge and familiarity of Internet and Intranet;
- Internet information search and access;
- use of multimedia courseware on the Internet;
- software download from the Internet;
- familiarity with features of multimedia software;
- use of commercial multimedia software;
- use of Internet browsers and e-mail; and
- use of campus network to make comments and suggestions regarding and to the management of the school.

The second unit covers more advanced techniques, e.g., the design and development of multimedia courseware using PowerPoint and FangZhen Author, a multimedia authoring system in Chinese platform developed by Beijing University in China. It also covers the use of word processing and network safety and security issues.

The method of learning for this group is a combination of self-study and group training. The first unit takes thirty hours. Well-organized workshops are scheduled several times every term for teachers to go through the training. Everyone in this group is required to master the skills stipulated in the first unit. The second unit also takes thirty hours. At present time, two to three teachers who are more experienced in technology are selected from each program area to participate in the unit two training, which requires more advanced skills. Thus, a cross-discipline faculty group with more advanced technology skills is formed in the school. Members of the group can provide support to each other in the development of multimedia courseware.

Technology Expectations and Activities for Students

In addition to computer courses with graduated difficulty, teachers are designated to

direct after school programs for students to ensure the quality of technology infusion. The following are some examples.

Student Journalism Group. Former student groups in broadcasting, newspaper, and photography were combined to form the Student Journalism Group. This group combines computer technology with photography, video taping, interview, and broadcasting to report the school events and news from faculty, staff, and students.

Student Computer Club. This club has several groups: programming, multimedia, network, database, and maintenance. Members of the Student Computer Club are a leading force in the school's effort to apply modern educational technology. They participate in the development of multimedia courseware, providing faculty with technical mentoring and assistance, and relieve them from tedious data entry routines. Club members also contribute to the management of the campus networks which connect all classrooms and offices, assist the school in entering large amounts of data into its databases, and in the communication with outside agencies through the use of networks, e.g., information exchange, locate, access, and retrieve information.

The Multimedia Computer Lab opens to students twice a week during the day. Students can use their own multimedia software in the lab, or use school's multimedia software collection that covers almost all subject areas. The General Purpose Computer Lab also opens twice a week for students to study the use of computers. It is required of all students to take at least 80 hours of hands-on computer instruction each year, and to use computers at least one hour each week during their free time. The computer labs that use a simulated Internet environment is managed and operated by students. The labs that have direct connection to the Internet are open to all students during the noon hours and in the evening. There is no limitation for students to use labs and classrooms with direct Internet connection.

QiBao Research Association for Modern Educational Technology

The purpose of the Association is for teachers to learn advanced and effective modern educational technology and methodology. Some of Association's interests include: How to use modern educational technology to enhance the quality of education? How to increase the efficiency of instruction? How to provide quality education effectively? And What is the relationship between technology and education? Members of the Association believe that these questions and tasks should be studied along with the characteristics of QiBao's faculty and student body, the technology facility, specific instructional needs, and the focus of each academic program.

The Impact of Technology in QiBao

Modern information technology has played an important role in the realization of the school's goals for the new millennium. The strategy and its technology have empowered and inspired QiBao faculty and students in their daily exchange among themselves, with educational organizations, and others in and out of China. It has assisted teachers and parents in their communications. And most importantly, there have been positive changes in student learning both

qualitatively and quantitatively.

Multimedia Courseware Contests

In order to further promote teachers' use of modern educational technology in their instruction, and continue the exploration of innovative ideas to solve instructional problems, the school held several multimedia courseware contests to recognize the leaders in technology infusion. The criteria for contests focus on the pedagogical soundness of the courseware. Awards were given at ceremonies attended by faculty and students of the school, as well as the head of Shanghai Education Commission, chief of district education bureaus, and principals of key high schools.

Summary of Qibao's Practice

Developing state-of-the-art infrastructure and goals that are realistic and relevant to school's mission, providing systematic and organized training for all employees, involving students in implementing technology, focusing on curriculum infusion, using policy reinforcement, these practices communicate a clear message to everyone at Qibao that technology is important. Qibao now has a technology infused curriculum. A critical mass that is sufficient to sustain technology infusion has been formed. Most importantly, Qibao has reached its goal of becoming a national model of middle schools, producing well-rounded graduates and enabling continuous professional and personal growth of its employees. Qibao is ready for a new paradigm.

Conclusions

Some educators in the United States may unlikely think about learning technology infusion from China - or anywhere else. National cultures, traditions, and institutional characteristics heavily influence educational practices. But it is always useful to focus on best principles. If we understand why certain practices work and what distinguishes them fundamentally from other practices, we will be able to identify the underlying principles involved. That universal idea can then be transported and applied to local context.

It is a fact that both China and the United States are concerned about the quality of education, acknowledge the power of technology as a means for education reform, and both focus on developing faculty capacity for technology infusion. At Qibao, as in many other schools in China, technology is presented as a necessary tool to achieve the instructional goals established by the mission of the school, instead of a peripheral skill which may be well understood by those who implement technology and attend the computer labs, but little understood and sometimes resented by those who "have" to accept it as additional skills to be acquired.

Qibao places significant emphasis on training its teachers beyond the basic level of technology competence. Teachers are trained to develop software to use in their own teaching, and software development is across curriculum. This approach makes sense because such software programs are more likely to be applicable in teaching, and teachers are more likely to use

the material they have developed.

In the United States and China, there are significant differences in the policy formulation and administrative process. The obvious emphasis of the traditional "top-down" model of policy formulation in Qibao is in contrast with the clearly visible "bottom-up" influences found in most American educational systems. The authors believe that cultural change in institutions requires grass-root initiatives as well as policy reinforcement. Grass-root initiatives may provide the fertile soil for institutional change, but to sustain the change and provide a foundation for a paradigm shift, grass-root initiatives alone are not sufficient. Policy is required to define and reinforce a positive change.

At Qibao, training to master and use technology appear to be well-organized, contents are carefully planned, and training is provided to all school employees. Everyone is expected to support the comprehensive school mission. These directed undertakings have produced impressive outcomes. Organized training and utilization required of all employees, from top administrators to clerical staff, obviously helped reach the critical mass of technology users essential to a paradigm shift in QiBao.

To the American educational culture, it may seem an overwhelming demand to require the participation in training, passing of exams and timelines with promotion consequences. It is not hard to imagine resistance and some resentment from everyone: teachers, administrators, and clerical staff. But we don't have to look beyond the American experience to find examples of rigorous professional requirements. A number of professions in the United States have licensing examinations for initial entry and for continuous professional certification, e.g., medicine, engineering, accounting, etc. Why not education? Why not teachers?

The authors found that Qibao is very effective in enlisting help from students in technology infusion. Some American schools are doing the same, but more schools need to develop strategies to involve students in technology activities, and to foster an environment where learning in technology as well as in other subjects is a reciprocal process between teachers and students.

The authors believe that some of Qibao's experiences discussed in this study are unique to the China situation and may be advantageous only in that particular environment. It is likely, for example, that there are more restrictions on accessing and distributing Internet information. Yet, for quite different reasons, they may have relevance for American schools.

Note: Part of the same study has been accepted by T.H.E. Journal and will appear in the February 2000 issue.

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